We shouldn't be doing endo surgery in fit patients!

Team endo surgery

Piergiorgio Cao, MD, FRCS

Disclosure

Speaker name:

Piergiorgio Cao

❑ I do not have any potential conflict of interest

WHO IS MY OPPONENT?

Surgical Repair of Descending Thoracic and Thoracoabdominal Aortic Aneurysms in

Open Surgical Repair of Descending Thoracic Aortic Aneurysms in the Endovascular Era: A

Type IV Thoracoabdominal Aneurysm Repair: Predictors of Postoperative Mortality, Spinal Cord Injury, and Acute Intestinal Ischemia

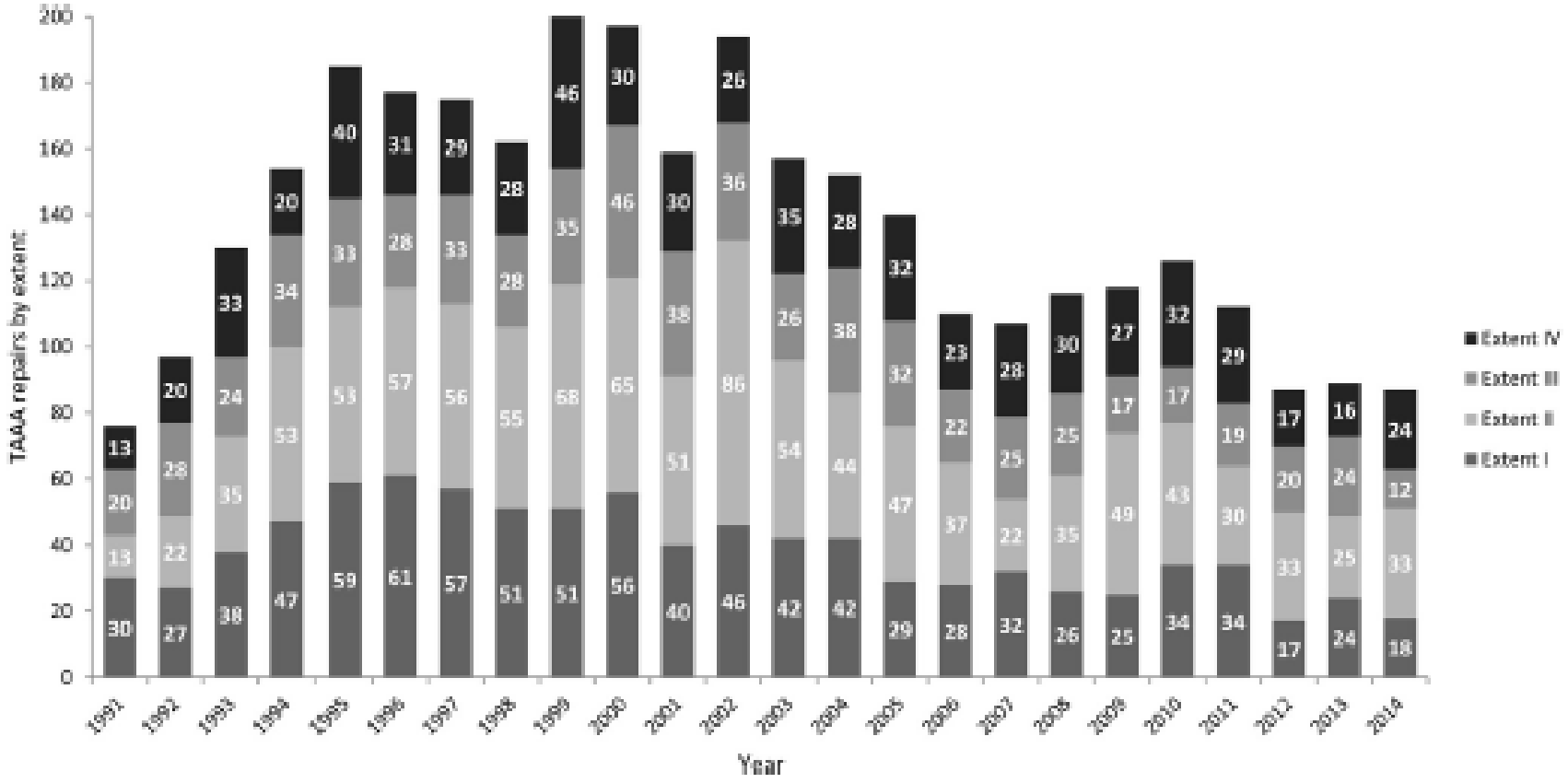
Allograft replacement for infrarenal aortic graft infection: Early and late results in 179 patients

Open repair of chronic post-traumatic aneurysms of the aortic isthmus: The value of direct aortoaortic anastomosis

Edouard Kieffer, MD, Jean-Pascal Leschi, MD, and **Laurent Chiche, MD,**
Paris, France

Outcomes of 3309 thoracoabdominal aortic aneurysm repairs

Joseph S. Coselli, MD,[a,d,e] Scott A. LeMaire, MD,[a,b,c,d,e] Ourania Preventza, MD,[a,d,e] Kim I. de la Cruz, MD,[a,d,e] Denton A. Cooley, MD,[d] Matt D. Price, MS,[a,d] Alan P. Stolz, MEd,[a,d] Susan Y. Green, MPH,[a,d] Courtney N. Arredondo, MSPH,[b] and Todd K. Rosengart, MD[a,c,d,e]



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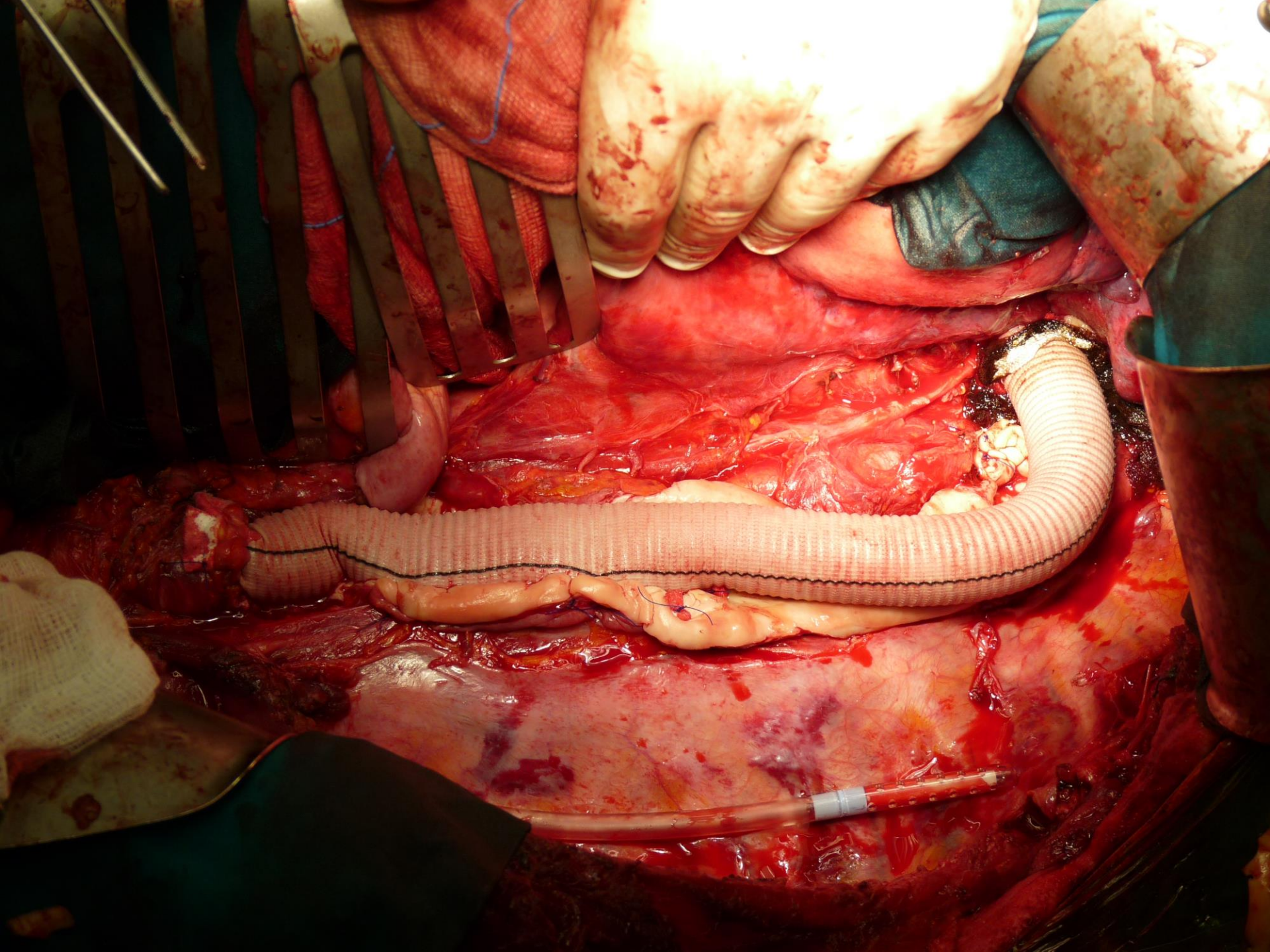

Percutaneous approach and early revascularization of lower limbs

Key points

- fEVAR/bEVAR, due to lower invasiveness based on the information provided by several case series, is increasingly performed for TAAA

- Confusing and Conflicting results are reported in the literature

- No level 1 evidence supports the use of this technology in **fit patients**

A propensity-matched comparison of outcomes for fenestrated endovascular aneurysm repair and open surgical repair of complex abdominal aortic aneurysms

Maxime Raux, MD,[a,b] Virendra I. Patel, MD, MPH,[b] Frédéric Cochennec, MD,[a] Shankha Mukhopadhyay, MS,[b] Pascal Desgranges, MD, PhD,[a] Richard P. Cambria, MD,[b] Jean-Pierre Becquemin, MD,[a] and Glenn M. LaMuraglia, MD,[b] *Créteil, France; and Boston, Mass*

J Vasc Surg 2014

2001 – 2012:

59 FEVAR and 324 OSR

older timing of the study reflecting the effect of developing training and techniques

Table III. Univari

Outcome	FEVAR (*n* = 42) (%)	OSR (*n* = 147) (%)	P
30-day mortality	9.5	2	.04
Complication			
Any	43	23	.01
Cardiac	4.8	9.5	.2
Pulmonary	12	10	.2
Renal	7.1	2.7	.1
Procedural	24	8	.004
Graft	33	2	<.0001

Table V. Multivariable models for 30-day outcomes in matched patients

Outcome	*OR*	*95% CI*	P
	5.1	1.08-24	.04
	2.3	1.1-4.9	.03
COPD	3.3	1.7-6.7	.0008
Cardiac complication			
FEVAR	0.47	0.1-2.2	.34
Pulmonary complication			
FEVAR	1.19	0.41-3.5	.75
Renal complication			
FEVAR	2.8	0.6-13	.2
Procedural complication			
FEVAR	4.3	1.5-12	.006
MI	3.9	1.4-11	.009
COPD	4.3	1.6-11	.004
Graft complication			
FEVAR	24	6.5-89	<.0001

Endovascular Repair With Fenestrated-Branched Stent Grafts Improves 30-Day Outcomes for Complex Aortic Aneurysms Compared With Open Repair

Nikolaos Tsilimparis,[1] Sebastian Perez,[1] Anand Dayama,[1] and Joseph J. Ricotta II,[1,2] Atlanta, Georgia

American College of Surgeons National Surgical Quality Improvement Program database

2005-2010: **1091** open repair and **264** endo repair

Table I. Epidemiologic data of the study cohort

	Open repair	FEVAR
Female	311 (28.5%)	47 (17.8%)
African-American	41 (3.8%)	7 (2.7%)
ASA I/II		14 (5.3%)
ASA III	)	181 (68.6%)
ASA IV	)	69 (26.1%)
ASA V	1 (0.1%)	0

Only ¼ of FEVAR patients was **ASA 4**

Ann Vasc Surg 2013

Endovascular Repair With Fenestrated-Branched Stent Grafts Improves 30-Day Outcomes for Complex Aortic Aneurysms Compared With Open Repair

Nikolaos Tsilimparis,[1] Sebastian Perez,[1] Anand Dayama,[1] and Joseph J. Ricotta II,[1,2] Atlanta, Georgia

Table III. Thirty-day outcome of open repair versus repair with fenestrated-branched stent grafts for complex aortic aneurysms

	Open repair	FEVAR	*P* value[a]	Total cohort
Mortality	59 (5.4%)	2 (0.8%)	0.001	61 (4.5%)
Any complication	458 (42%)	51 (19.3%)	<0.001	509 (37.6%)
Any nonsurgical complication	324 (29.7%)	21 (8.0%)	<0.001	345 (25.5%)
Surgical complication	240 (22%)	40 (15.2%)	0.014	280 (20.7%)
Pulmonary complication	232 (21.3%)	6 (2.3%)	<0.001	238 (17.6%)
Renal complication	108 (9.9%)	4 (1.5%)	<0.001	112 (8.3%)
Cardiovascular complication	85 (7.4)	5 (1.9%)	0.001	90 (6.6%)
Graft failure	11 (1.0%)	7 (2.7%)	0.036	18 (1.3%)
Any sepsis postoperative	110 (10.1%)	4 (1.5%)	<0.001	114 (8.4%)
Return to operation room	110 (10.1%)	12 (4.5%)	0.005	122 (9.0%)
Days of operation to discharge	10 ± 9.6	3.0 ± 4.3	<0.001	8.7 ± 9.2

[a]Indicates $P < 0.005$.

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Results and Factors Affecting Early Outcome of Fenestrated and/or Branched Stent Grafts for Aortic Aneurysms

A Multicenter Prospective Study

Ann Surg 2015

J. Marzelle, MD, E. Presles, MSc,† and J. P. Becquemin, MD, PhD*; On behalf of the WINDOWS trial participants (see appendix)*

2009 – 2012: 268 patients

8 University Hospitals each having previously performed **at least 15 f/b-EVAR**

Results and Factors Affecting Early Outcome of Fenestrated and/or Branched Stent Grafts for Aortic Aneurysms

A Multicenter Prospective Study

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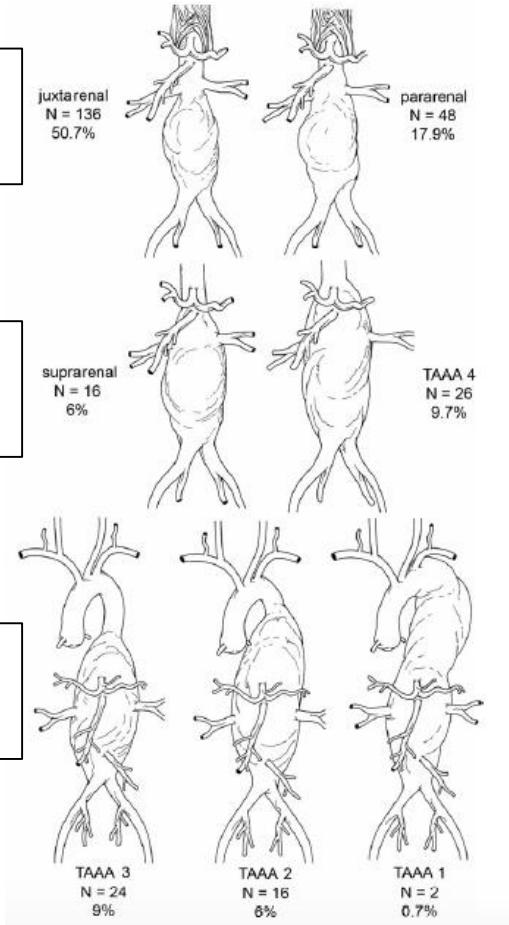

	In-hospital death	Severe complications and death
GROUP 1 N = 184	6.5 %	17.2 %
GROUP 2 N = 42	14.3 %	25 %
GROUP 3 N = 42	21.4 %	31 %
OVERALL N = 268 →	10.1 %	22 %

Results and Factors Affecting Early Outcome of Fenestrated and/or Branched Stent Grafts for Aortic Aneurysms

A Multicenter Prospective Study

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TABLE 6. Predictive Factors of Outcome in Patients Treated by f/b-EVAR

	Univariate Analysis		Multivariate Analysis	
	HR; 95% CI	***P***	**HR; 95% CI**	***P***
30-d mortality: 6.7%				
Group 1 vs 2 and 3*	2.70; 1.09–7	0.0321	ND	
PAOD	2.9; 1.15–7.36	0.0246	ND	
Intraoperative complications	5.92; 2.25–14.91	0.0003	ND	
PAOD	4.55; 1.39–14.92	0.0123	ND	
Type of graft				
Fenestrated	1.0	0.0002	ND	
Branched	18.4; 4.59–73.46	0.0002	ND	
Fenestrated and branched	5.82; 0.97–34.86	0.0002	ND	
Upper limb approach	18.4; 3.98–85.3	0.0002	ND	
Thoracic stent graft	11.42; 3.34–39.03	0.0001	ND	
4 fenestrations and/or branches vs 1–3	6.80; 1.80–25.64	0.0046	ND	

*The difference between groups was not statistically significant.
ND indicates not done (low number of events); only significant variables are detailed in multivariate analysis.

- **Group 2 or 3** (vs 1): predictive factor of **severe complications and death** (HR = 2.10; 95% CI: 1.26–3.48; P = 0.0043)

- **Technical complications** and **intervention time** significantly influenced **in-hospital mortality** (HR = 4.39; 95% CI: 2.05–9.38; P = 0.0001) and **severe complications and death** (HR = 3.07; 95% CI: 1.84–5.11; P < 0.0001)

FENESTRATED/BRANCHED – evolution of technique

Editor's Choice — The Impact of Early Pelvic and Lower Limb Reperfusion and Attentive Peri-operative Management on the Incidence of Spinal Cord Ischemia During Thoracoabdominal Aortic Aneurysm Endovascular Repair

B. Maurel [a], N. Delclaux [a], J. Sobocinski [a], A. Hertault [a], T. Martin-Gonzalez [a], M. Moussa [a], R. Spear [a], M. Le Roux [a], R. Azzaoui [a], M. Tyrrell [b], S. Haulon [a,*]

[a] Aortic Centre, Hôpital Cardiologique, CHRU de Lille, INSERM U1008, Université Lille Nord de France, 59037 Lille Cedex, France
[b] King's Health Partners, London, UK

Table 2. Thirty day complication rates.

	Total ($n = 204$)	Group 1 ($n = 43$)	Group 2 ($n = 161$)	RR (95% CI)	p
Major complications	54 (26.5)	15 (34.9)	39 (24.2)	1.1637 (0.9195–1.4728)	.11
Spinal cord ischemia	8 (3.9)	6 (14.0)	2 (1.2)	1.1477 (1.0163–1.2961)	<.01
30 day mortality	14 (6.9)	5 (11.6)	9 (5.6)	0.4807 (0.1699–1.3604)	.15
Minor complications	56 (27.5)	12 (27.9)	44 (27.3)	1.0080 (0.8181–1.2420)	.54

Note. Values are given as n (%). RR = relative risk; CI = confidence interval.

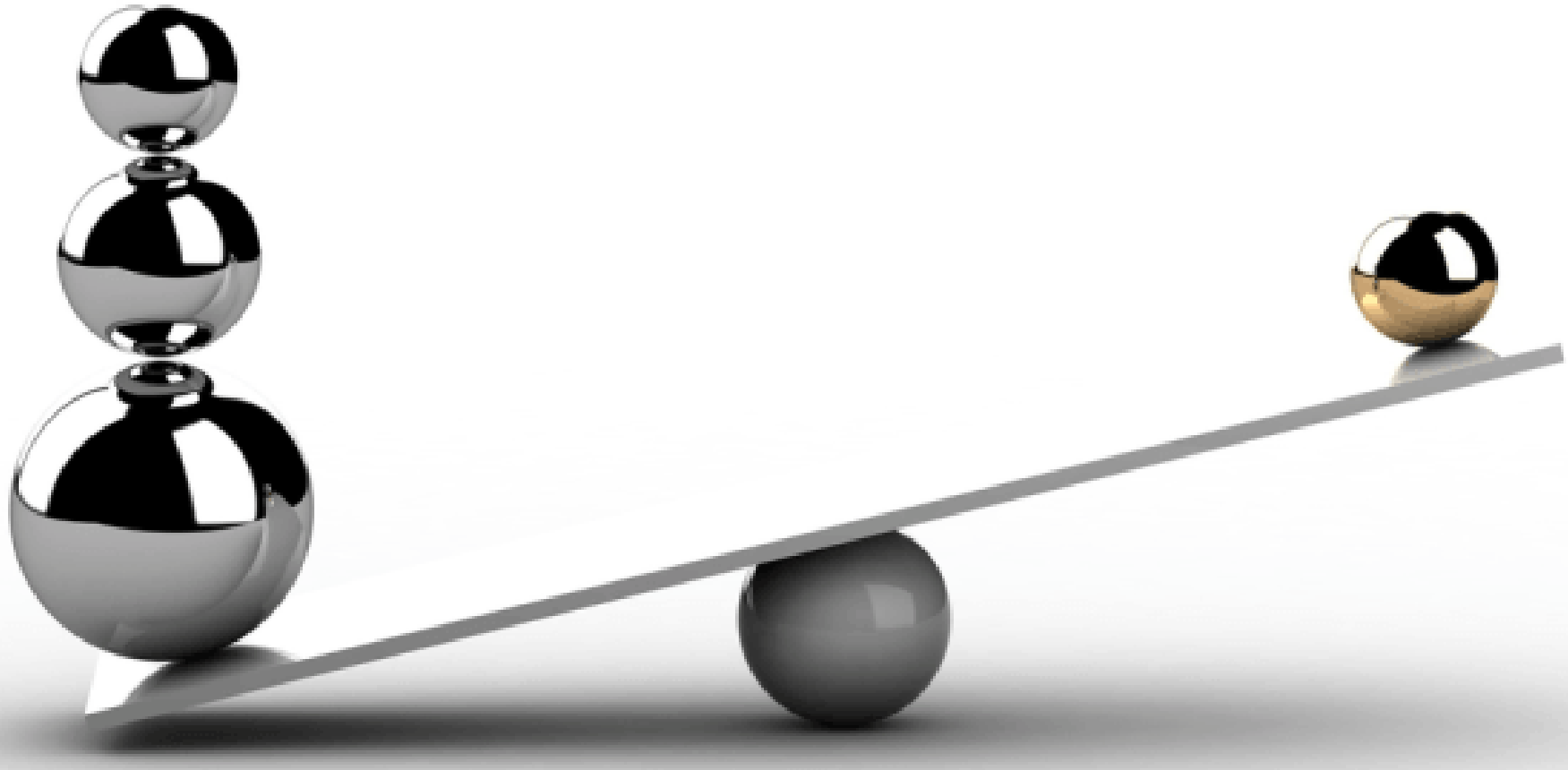
Table 3. Thirty day outcomes of patient with type I, II, and III thoracoabdominal aortic aneurysms.

	Group 1 ($n = 24$)	Group 2 ($n = 95$)	RR (95% CI)	p
Major complications	12 (50.0)	27 (28.4)	1.4316 (0.9409–2.1781)	.04
Spinal cord ischemia	6 (25.0)	2 (2.1)	1.3053 (1.0341–1.6475)	<.001
30 day mortality	5 (20.8)	7 (7.4)	0.3537 (0.1229–1.10175)	.06
Minor complications	8 (33.3)	30 (31.9)	1.0213 (0.7454–1.3993)	.54

Note. Values are given as n (%). RR = relative risk; CI = confidence interval.

Eur J Vasc Endovasc Surg 2015

…what about comparative studies?



A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

Ciro Ferrer, MD,[a] Piergiorgio Cao, MD, FRCS,[a] Paola De Rango, MD, PhD,[b] Yamume Tshomba, MD,[c] Fabio Verzini, MD, PhD, FEBVS,[b] Germano Melissano, MD,[c] Carlo Coscarella, MD,[a] and Roberto Chiesa, MD,[c] *Rome, Perugia, and Milan, Italy*

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2007 – 2014: 341 patients

84 TAAA endo repair (Group 1)

257 TAAA open repair (Group 2)

A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

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Table I. Demographics and baseline characteristics of 84 patients undergoing endovascular repair (*ER*) and 257 patients undergoing open surgery (*OS*) for thoracoabdominal aortic aneurysm (TAAA)

	ER, No. (%)	*OS, No. (%)*	P *value*
Patients	84	257	
Mean age, years	72.1	66.2	<.001
Male	63 (75)	195 (75.6)	.88
Smoking	23 (27.4)	107 (41.6)	.02
Hypertension	76 (90.5)	234 (91.1)	.83
Dyslipidemia	37 (44)	157 (61.1)	.08
CAD	47 (56)	63 (24.5)	<.001
COPD	43 (51.2)	127 (49.4)	.80
Diabetes	8 (9.5)	50 (19.5)	.04
Renal impairment	12 (14.3)	56 (21.8)	.15
Previous aortic surgery	28 (33.3)	55 (21.4)	.40
Urgent/emergent	1 (1.1)	12 (4.7)	.04

CAD, Coronary artery disease; *COPD,* chronic obstructive pulmonary disease.

Table II. Demographics and baseline characteristics after propensity score matching

	ER, No. (%)	*OS, No. (%)*	P *value*
Patients	65	65	
Mean age, years	70.7	70.7	.95
Male	51 (78.5)	49 (75.4)	.83
Smoking	21 (32.3)	22 (33.8)	1
Hypertension	59 (90.8)	61 (93.8)	.74
Dyslipidemia	34 (52.3)	36 (55.4)	.86
CAD	31 (47.7)	33 (50.8)	.86
COPD	34 (52.3)	30 (46.2)	.59
Diabetes	5 (7.7)	7 (10.8)	.76
Renal impairment	10 (15.4)	12 (18.5)	.81
Previous aortic surgery[a]	23 (35.4)	15 (23.1)	.17
Urgent/emergent	1 (1.5)	3 (4.6)	.61

CAD, Coronary artery disease; *COPD,* chronic obstructive pulmonary disease; *ER,* endovascular repair; *OS,* open surgery.

[a]In the 65 ER patients, there were six infrarenal abdominal aortic aneurysms and 17 ascending aorta repairs; in the 65 OS patients, there were 8 abdominal aortic aneurysms, 4 ascending aorta/arch aneurysms, 2 thoracic aortic aneurysms, and 1 thoracoabdominal aortic aneurysm (TAAA).

A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

J Vasc Surg 2016

Ciro Ferrer, MD,[a] Piergiorgio Cao, MD, FRCS,[a] Paola De Rango, MD, PhD,[b] Yamume Tshomba, MD,[c] Fabio Verzini, MD, PhD, FEBVS,[b] Germano Melissano, MD,[c] Carlo Coscarella, MD,[a] and Roberto Chiesa, MD,[c] *Rome, Perugia, and Milan, Italy*

PERIOPERATIVE RESULTS	Group 1 N = 65 (%)	Group 2 N = 65 (%)	p
Composite endpoint	**12 (18.5)**	**24 (36.9)**	**0.03**
• Death	5 (7.7)	4 (6.2)	1
• Spinal cord ischemia	8 (12.3)	13 (20)	0.34
- Paraplegia	6 (9.2)	7 (10.8)	1
• Dyalisis	6 (9.2)	8 (12.3)	0.78
- Permanent	1 (1.5)	1 (1.5)	1
• Respiratory complications	0 (0)	8 (12.3)	0.006
ICU days	**1.6** (0-12)	**2.8** (1-13)	0.01
In-hospital days	**6.3** (3-23)	**16.3** (3-30)	<0.001

A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

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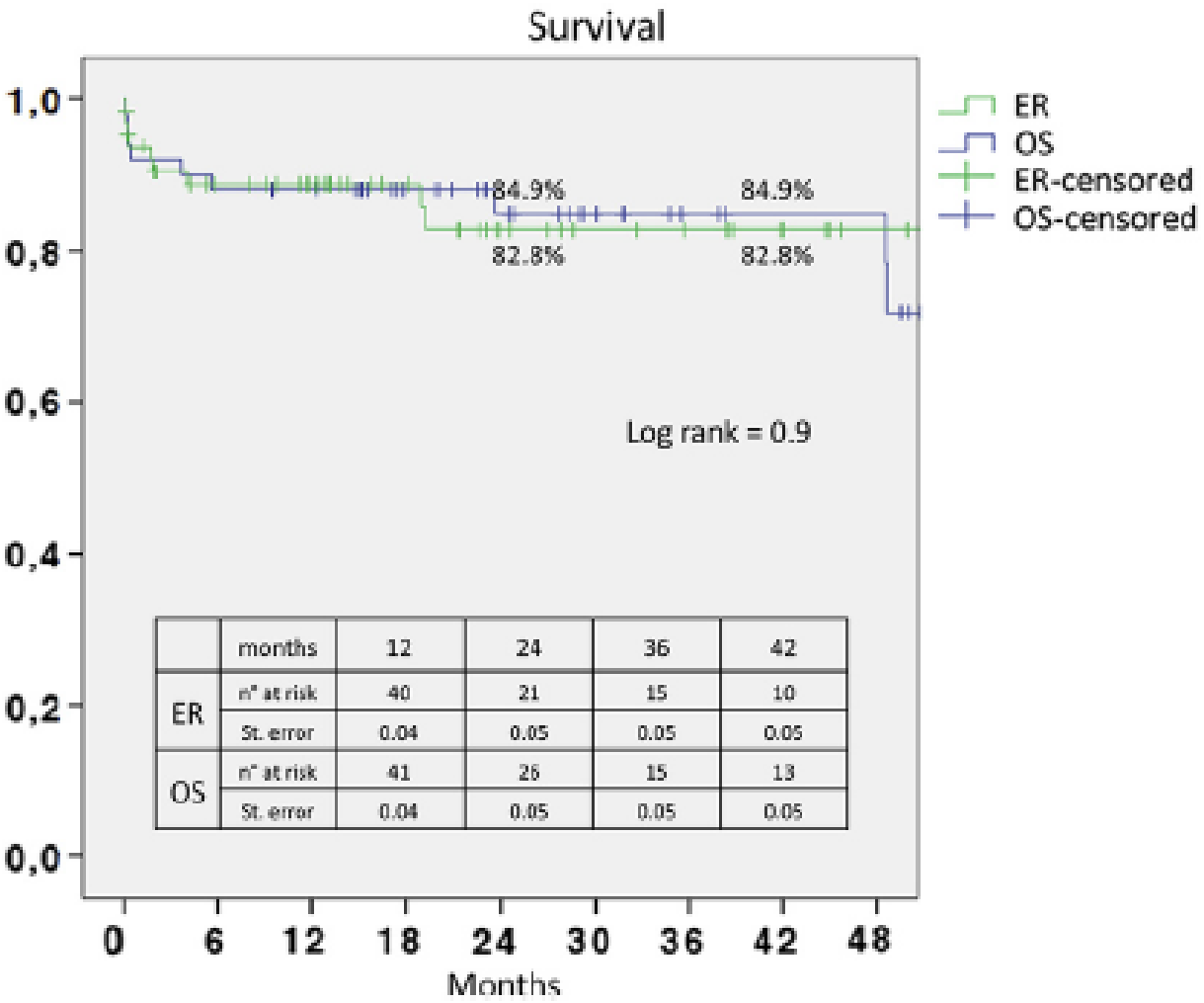

	months	12	24	36	42
ER	n° at risk	40	21	15	10
	St. error	0.04	0.05	0.05	0.05
OS	n° at risk	41	26	15	13
	St. error	0.04	0.05	0.05	0.05

A propensity-matched comparison for endovascular and open repair of thoracoabdominal aortic aneurysms

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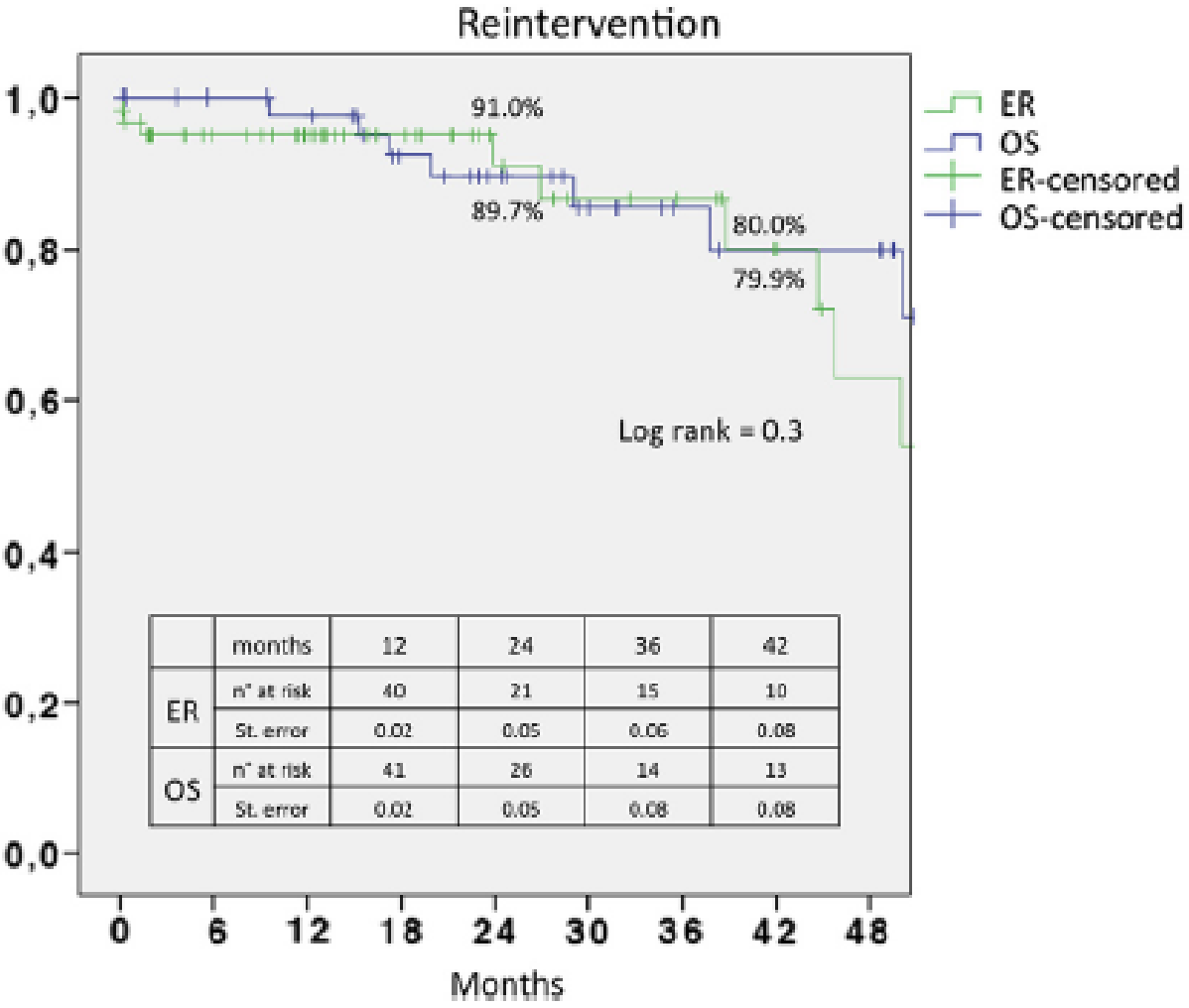


	months	12	24	36	42
ER	n° at risk	40	21	15	10
	St. error	0.02	0.05	0.06	0.08
OS	n° at risk	41	26	14	13
	St. error	0.02	0.05	0.08	0.08

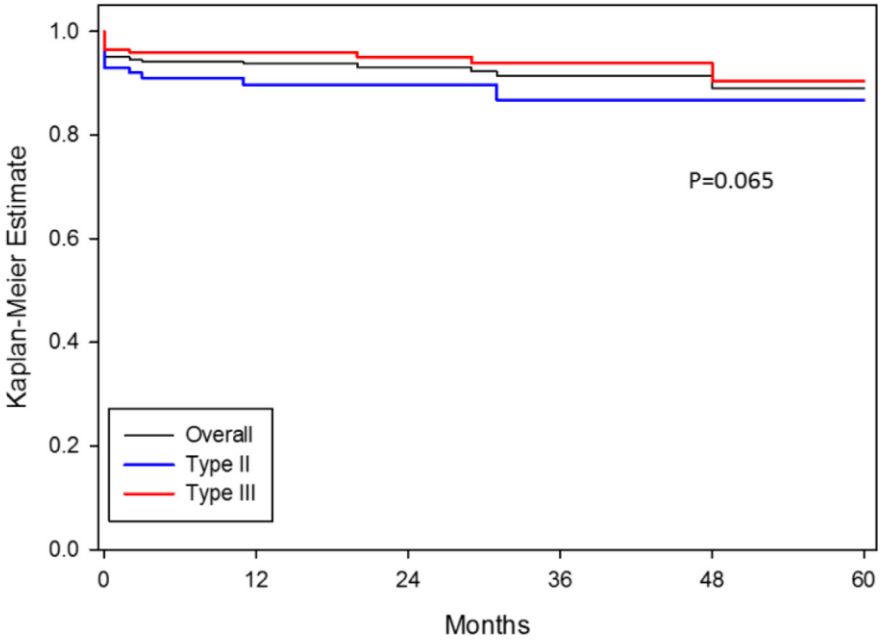
JOURNAL OF VASCULAR SURGERY
April 2016

Fenestrated and branched endovascular aneurysm repair outcomes for type II and III thoracoabdominal aortic aneurysms

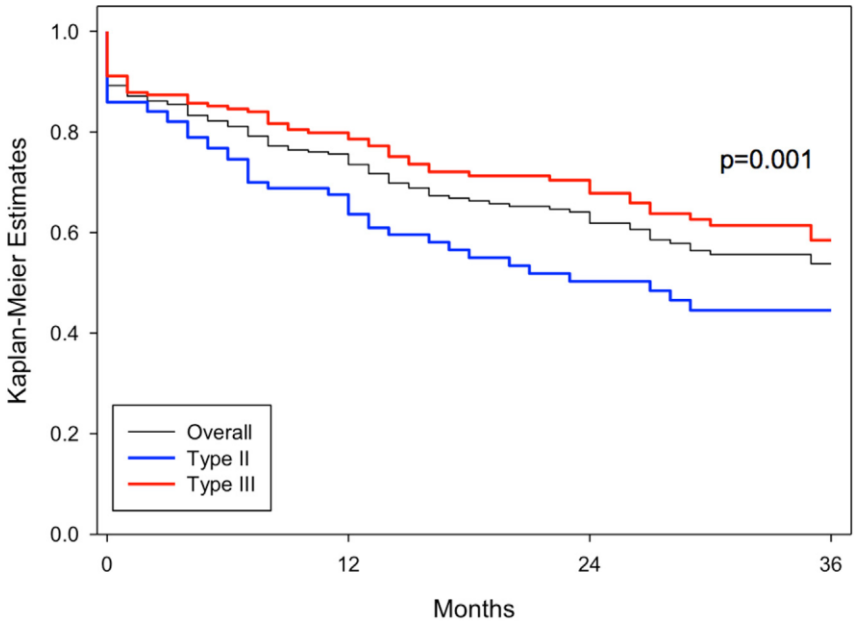
Matthew J. Eagleton, MD, Matthew Follansbee, BS, Katherine Wolski, MPH, Tara Mastracci, MD, and **Yuki Kuramochi, BScN,** *Cleveland, Ohio*

354 pts (type II and III TAAA) → SCI 8.8% (permanent 4%)
Periop Death 4.8%

36 mths aneurysm related death



36 mths reintervention rate



Outcomes of 3309 thoracoabdominal aortic aneurysm repairs

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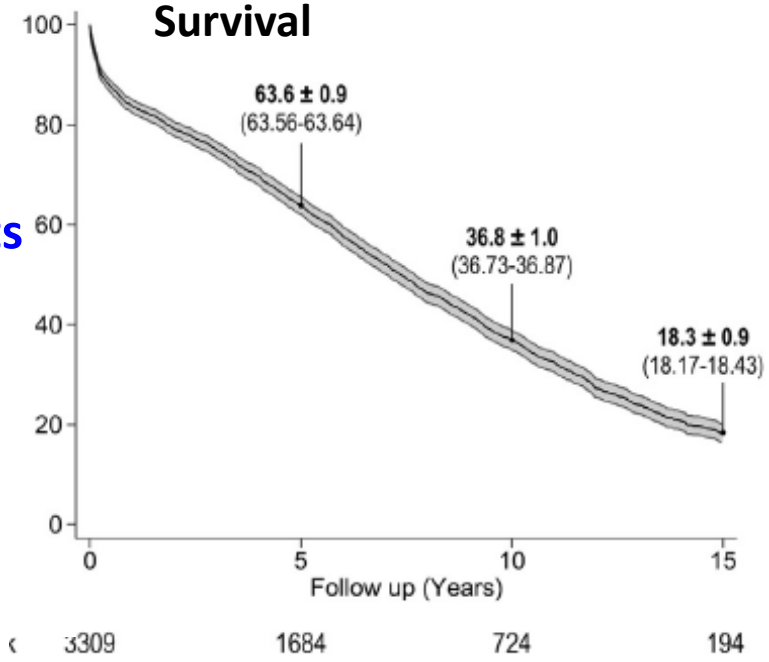
Early Results

2586 pts elective (type II and III TAAA) → SCI 3.95 (permanent paraplegia)

Periop death 8.2%

Late results



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- Open repair is the gold standard for treatment of TAAA mostly in fit patients

- In current well-balanced comparative series and in single large volume centers ER is associated with similar mortality and SCI if compared with OS

- However learning curve and small cases load have not been taken in to account in the available literature on ER

- We should perform endo surgery in fit patients, but adequate TEAM Work and Center experience is crucial.

The importance of the Learning Curve and

- 1 or 2 interventionalists with the techinical skills of the team LEADER
- Double team (time saving, blood loss, early revscularization of lower limbs, percutaneus approach)
- Highly specialized anesthesiologist deeply involved in complex aortic surgery
- Highly specialised OR Nurses

Outcomes of 3309 thoracoabdominal aortic aneurysm repairs

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"Repairing TAAA poses substantial risks , particularly when the entire thoracoabdominal aorta (extent II) is replaced . Nonetheless , our dat suggest that TAAA repair , when performed in experienced center, can produce respectable outcomes"